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Medley
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EPA SUBMITTAL

ADDITIONAL DATA REQUIREMENTS TO
SUPPORT PREPARATION OF A BASELINE RISK
ASSESSMENT AND FEASIBILITY STUDY
FOR THE

MEDLEY FARM SITE
GAFFNEY, SOUTH CAROLINA

JULY 11, 1990

SIRRINE PROJECT NO. G-8026.00

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EXECUTIVE SUMMARY

Based upon evaluation of the results of Phase I Remedial Investigations (RI) performed at the Medley Farm Superfund Site and consideration of the Agency's comments on the draft RI Report, Phase II Remedial Investigations are required. Additional work will provide data necessary to complete the evaluation of potential risks associated with the site and to support the development and comparison of potential remedial alternatives. This is consistent with the approved Work Plan and POP for this site which includes a Phase II RI.

Specific data needs are summarized below and discussed in more detail in the following text.

- SURFACE SOILS

The Phase I RI revealed that some former source areas (i.e. lagoon sites) were not covered with clean fill as historical records indicated. There is, therefore, a potential for exposure to contaminants which may be present in surface soils at the site. Phase I investigations did not include sampling and analysis of surface soils. This is required to complete a Risk Assessment which includes evaluation of this exposure route. Twelve surface soil samples to analyze for VOCs and semi-VOCs are included in the Phase II RI Work Plan.

- GROUND WATER

Phase I data do not define potential radial components of ground-water flow from the former disposal site. The agency has expressed concern that the Sprouse domestic well, located approximately 800 feet northwest of the site, may be impacted by contaminants from the site. Additional wells and piezometers are required to confirm ground-water flow patterns at the site and to provide additional substantiation that the Sprouse well has not been impacted.

Significant levels of volatile organic chemicals were detected in one of four bedrock wells installed during the Phase I RI. In accordance with the agency's comments, additional work is required to evaluate the extent of contaminant migration, vertically and horizontally, in the bedrock aquifer and to define the relationship between the bedrock and saprolite aquifers.

Up to six additional saprolite wells and seven additional bedrock wells and further sampling and analyses for VOCs in ground water are included in the Phase II RI Work Plan to provide the additional ground water data.

1.0 INTRODUCTION

The Medley Farm Site (hereafter referred to as the Site) is approximately 7 acres of the Ralph Medley farm property located in a rural section of Cherokee County, 6 miles south of Gaffney, South Carolina. The Site is currently ranked 850 out of 989 sites on the National Priority List (55 Federal Register 9688). Prior to the mid-1970s, the Site was maintained as woods and pasture land. Waste disposal reportedly began at the site in 1973 and ended in June, 1976. At the time of the South Carolina Department of Health and Environmental Control (SCDHEC) inspection in 1983, drums were stored on-site in a random fashion. Drums were scattered in open pits and in one of six small lagoon areas. No formal records of disposed waste materials were maintained at the Site.

During late spring and early summer of 1983, waste materials were removed from the Site under an immediate removal action directed by EPA, pursuant to Section 104 of CERCLA. A total of 5,383 55-gallon and 15-gallon containers were removed from the Site. Approximately 70,000 gallons of water were collected from six small lagoons, treated using sand filtration and carbon adsorption, and discharged to Jones Creek. Approximately 2,132 cubic yards of solid waste, lagoon sludge, and surficial soils were removed from the Site. The lagoons were then backfilled with clean soils and/or graded to the surrounding topography. Analytical testing of solid and liquid waste materials indicated that the primary chemical constituents consisted of volatile organic compounds. These included toluene, benzene, methylene chloride, tetrachloroethylene and vinyl chloride.

Remedial Investigation (RI) field activities for Phase I were conducted from October 1988 to January 1990. The Phase I RI was performed in accordance with applicable EPA guidance and included the following activities specified in the Project Operations Plan (Sirrinc, January 1989):

- Soil gas survey
- Test pit excavation and soil sampling
- Installation of monitoring wells
- Advancement and sampling of soil borings
- In-situ hydraulic conductivity testing
- Stream gauging
- Fracture trace analysis and aerial photograph review
- Ground water, surface water, and sediment sampling and analysis
- Interpretation of Site hydrogeologic conditions
- Interpretation of analytical data
- Selection of Site indicator chemicals for use in the Risk Assessment (RA)
- Statement of conclusions.

The Phase I RI reached the following conclusions:

- volatile and semi-volatile organics are the only site-related chemicals in soils
- volatile organics are the only site-related chemicals in groundwater
- surface waters and sediments do not contain site-related chemicals
- metals are within background levels for all media
- low levels of pesticides and PCBs at the Site are consistent with agricultural uses of the former farm.

1.1 RI APPROACH

As stated in the POP, the RI is designed as a two phase effort. Phase I consists of a screening effort (Phase IA) and a focused effort (Phase IB) based on the previous results. Phase IA results were used to define the sampling locations and analytical requirements for Phase IB. Samples collected during Phase IA were analyzed for Target Compound List (TCL; organics) and Target Analyte List (TAL; inorganics) parameters. Samples collected

during the Phase IB were analyzed for site-specific indicator parameters that were approved by the EPA. Phase I of the RI provided initial characterization of the hydrogeology and the distribution of chemical residuals at the Site. The second phase of the RI, Phase II, is an optional phase which may be employed if Phase I data indicates the need for additional investigatory activities (See Project Operations Plan, Medley Farm Site, January 1989; p. 17 and Figure 2.3). The purpose of Phase II is to focus on identified data needs to support potential remedial actions if such needs are apparent from the Phase I data.

2.0 RISK ASSESSMENT

The baseline human health risk assessment is being prepared in accordance with the interim final document Human Health Evaluation Manual (EPA, December 1989). The environmental endangerment assessment is being prepared in accordance with the interim final document Environmental Evaluation Manual (EPA, March 1989). The evaluation of exposure pathways is being conducted in accordance with the Superfund Exposure Assessment Manual (EPA, April 1988). Calculation of potential exposure point concentrations in the ground water pathway is being conducted using Selection Criteria for Mathematical Models Used in Exposure Assessments: Ground Water Models (EPA, May 1988). The Baseline Risk Assessment will be submitted as part of the Feasibility Study document.

2.1 STATUS

Toxicity profiles for the chemicals of concern have been prepared. Representative chemical concentrations for the media of concern have been estimated for use in the quantitative risk assessment based upon the results of Phase I analyses. Additional sampling and analysis is required to accurately characterize potential exposure through surface soils. Additional characterization of the aquifers beneath the site and the horizontal and vertical extent of residual chemicals in ground water is also needed to confirm preliminary evaluations of chemical migration pathways and potential exposure points and concentrations.

Risk assessment parameters have been determined by characterization of the exposure setting. Preliminary exposure point concentrations have been estimated and potentially exposed human and wildlife populations have been identified through receptor analysis, including consideration of present and future land use on and off the property.

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Two potentially significant exposure pathways for the present (baseline) conditions at the Site have been identified: surface soils and ground water. The soil pathway involves potential contact with surface soils containing residual chemicals and the potential uptake of those chemicals by wildlife (primarily deer) through ingestion of plants growing on soils containing residual chemicals. Plant consumption by wildlife may have the potential for impacting human health. Models have been developed for the quantitative assessment of potential risks through the surface soil pathway.

Ground water is the other potentially significant exposure pathway that has been identified. The Phase I Draft RI Report concludes that the direction of ground-water flow from the former disposal site is toward the eastern and south-eastern property boundaries. The Agency, however, expressed concerns regarding the potential for radial flow from the site in their comments on the draft document. The Phase I RI also concluded that the contaminant plume is located within the property boundary. The Agency has also indicated that due to the potential for radial flow and the migration of contaminants in the bedrock aquifer, Phase I data is insufficient to make this conclusion. Additional data is needed, therefore, to confirm these conclusions of the Phase I RI. The proposed Phase II RI will provide additional characterization of the horizontal and vertical extent of chemical residuals in ground water and confirmation that there is no ground-water flow towards the nearby domestic water well (the Sprouse Well) northwest of the site.

For off-property receptors, the potential use of ground water at the property boundary is being used to assess potential exposure in the future. Preliminary modeling of future chemical concentrations in ground water at the property boundary has been performed. This information has been used for a preliminary ground water risk characterization for future, off-property receptors. The additional proposed work is also required to confirm these preliminary evaluations.

2.2 ADDITIONAL DATA REQUIREMENTS

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Results of the RI sampling suggest that clean fill material may not overlie the entire former disposal site that was remediated during the immediate removal action. Indicator chemical analyses of surface soil samples on and near the former disposal area are needed for the evaluation of risk associated with the surface soil pathway.

Phase I results show that additional ground water analytical data for the indicator chemicals are needed to improve the reliability of the estimates of future residual chemical concentrations in ground water at the property boundary. Additional data is also needed to determine the extent of residual chemicals in ground water and to confirm directions of ground-water flow and pathways of residual chemical migration in the aquifer system. Analytical data are needed for locations intermediate to the monitoring wells at the central part of the Site and the downgradient boundary of the Site.

2.3 RATIONALE

Previous information for the Site had stated that the former disposal area had been covered with clean fill material as part of the immediate removal operations. The RI findings suggest that some Site areas may not be covered with clean fill, thereby representing an exposure pathway for surface soils. Further soil sampling and analysis will provide a more reasonable assessment of potential exposure, especially through the soil-vegetation-wildlife pathway, and will provide data to quantify the site-specific potential for exposure to wildlife.

Ground-water data collected during the RI provided characterization of residual chemical concentrations in this medium and preliminary definition of the ground water plume and direction of movement. Existing data and preliminary modeling indicate that the plume is presently confined to the Ralph Medley farm property. Additional ground-water level and

analytical data are needed to validate these preliminary modeling projections and to more accurately quantify potential future exposure point concentrations predicted to occur at the property line.

In summary, results from Phase I RI activities show that additional soil and ground-water data is needed in order to compile a sound Risk Assessment. The need for the Phase II RI was stated by EPA in its comments on the draft RI Report (See Agency Comments Number 22, 26, 54 and 57).

3.0 FEASIBILITY STUDY

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The Feasibility Study (FS) is being prepared in accordance with the revised National Oil and Hazardous Substances Contingency Plan (NCP) of March 8, 1990 (55 FR 8666) and the interim final document Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA, August 1988). The FS report will be organized into the following chapters:

- 1.0 INTRODUCTION
- 2.0 SUMMARY OF REMEDIAL INVESTIGATION
- 3.0 BASELINE RISK ASSESSMENTS
- 4.0 REMEDIAL RESPONSE OBJECTIVES
- 5.0 IDENTIFICATION OF POTENTIAL TECHNOLOGIES
- 6.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES
- 7.0 DETAILED ANALYSIS OF ALTERNATIVES
- 8.0 SUMMARY OF ALTERNATIVES

3.1 STATUS

The draft RI report has been reviewed and evaluated with respect to potential remedial alternatives. The following FS requirements have been completed:

- Chapters 1 and 2
- assessment of ARARs (Chapter 4)

The following requirements are under development:

- soil remediation levels (Chapter 4)
- appropriateness of alternate concentration limits (Chapter 4)

- definition of areas of potential remediation (Chapter 4)
- evaluation of soil remediation technologies (Chapter 5)
- evaluation of ground-water recovery, treatment and discharge technologies (Chapter 5)
- formulation of remedial alternatives.

3.2 ADDITIONAL DATA REQUIREMENTS

Remedial alternatives must address exposure pathways that represent potentially significant risks to human health and the environment. The formulation of remedial alternatives cannot be completed until the significant Site exposure pathways have been determined by the baseline assessments. Preparation of the FS is therefore contingent upon completion of the baseline risk assessments.

The evaluation of potential remedial technologies has been divided between source control (soils, lagoon residuals) and groundwater control. Source control data requirements include a more thorough delineation of the lateral extent of chemical residuals in areas where there is no clean cover. Based upon Phase I data, additional sampling and analysis is required to determine the potential type and extent of any soil remediation, if required. Site-related chemicals in soils are limited to volatile and semi-volatile organics. The treatment of these compounds can effectively be estimated from physical/chemical data and treatability testing is not required.

The assessment of ground-water control alternatives requires the following information:

- lateral extent of migration
- vertical extent of migration
- hydraulic relationship between the saprolite and bedrock aquifers
- lateral migration patterns and discharge points
- effectiveness of ground-water extraction in the saprolite and bedrock aquifers.

Based upon Phase I of the RI, additional information is needed to complete evaluations of these critical factors.

This information will allow more accurate modeling of ground-water flow and residual chemical migration and will support the development of technically appropriate alternatives for ground-water remediation.

3.3 RATIONALE

Data validation requirements following the extended test pitting activities did not allow full review of the RI data until late March 1990. Evaluation requirements of the FS did not allow identification of any data deficiencies until early May 1990. Attempts to extrapolate existing RI data using the soil gas survey, Site topographical features, and historical aerial photographs were made but were not sufficiently quantitative to allow preparation of a thorough and defensible Feasibility Study. Comments from EPA/SCDHEC concerning the adequacy of the data to support the Feasibility Study were received on May 16th. EPA raised the need for additional quantitative information in these comments. After consideration of the Agency's comments and re-evaluation of potential impacts to the selection of remedial alternatives, additional quantitative information was determined to be necessary for further development of the Feasibility Study.

Previous information from the immediate removal action indicated that source areas had been regraded and covered with clean fill. Observations made while test pitting, as recorded on the test pit logs, show that this is not the case along the southern and eastern portions of the site. The lateral extent of Site residuals present in soils may be greater than initially indicated and must be delineated at this time.

Phase I of the RI determined the following regarding ground water at the Site:

- residual chemicals present in ground water have not reached Jones Creek
- the saprolite and bedrock aquifers contain site-related chemicals
- hydraulic conductivities of the saprolite and bedrock aquifer are low (approx. 10^{-4} to 10^{-5} cm/sec).

The Phase I information provides a valuable but incomplete characterization of Site hydrogeology. The data collected to date form a strong basis for directing additional hydrogeological characterization that will support a comprehensive assessment of groundwater control alternatives. Additional hydrogeological information is proposed to be collected in Phase II of the RI as provided for in the approved Project Operations Plan.

4.0 SUMMARY

Phase I of the Remedial Investigation determined significant information regarding the type and distribution of site-related chemicals at the Medley Farm Site. Additional characterization of the Site as part of the Remedial Investigation (Phase II) is necessary to perform a complete Baseline Risk Assessment and Feasibility Study. This is consistent with the approved POP for this site, which included an optional Phase II RI based upon evaluation of the results of Phase I efforts and the draft RI Report (Project Operations Plan - Medley Farm Site RI/FS, January 1989, p. 17.). Additional data needs include further delineation of the lateral and vertical extent of residual chemicals in ground water and additional assessment of the lateral extent of chemicals in surficial soils. The additional work proposed will focus on gathering data required to complete the evaluation of potential impacts to receptors and to support the selection of technically appropriate and feasible remedial alternatives for this site. Additional RI activities should provide sufficient data for the preparation of a Remedial Design document. Without additional Phase II RI assessment efforts, a separate field effort would be required to establish design parameters for any remedial action. The proposed Phase II RI will minimize any post - ROD assessment efforts. There should therefore be no impact to the overall time frame required for site assessment/remedial design activities, and implementation of any required Remedial Action.

Additional RI studies will also minimize the potential need for amendments to the R.O.D. The Phase I RI provided good initial characterization of site hydrogeologic conditions and identification of residual chemicals associated with former disposal activities. Although some limited data deficiencies were identified early in the RA and FS process, it was not evident that the collection of additional data would be critical until mid May, 1990. This was at the same time that the agency's comments on the draft RI were received. Since many of the Agency's comments indicated that a "Phase II study" would be necessary, it appeared appropriate to address additional data requirements during the scheduled RI review meeting. A work plan describing the Phase II efforts and a schedule are discussed below.

4.1 WORK PLAN

A work plan describing the field investigation activities and analyses proposed for the Phase II RI has been submitted to the Agency in conjunction with this document. The work plan also describes the purpose and application of the collected data in reference to the Baseline Risk Assessment and Feasibility Study. Activities will be performed in accordance with the procedures previously approved by EPA/SCDHEC, as presented in the Project Operations Plan (Sirrione, January 1989).

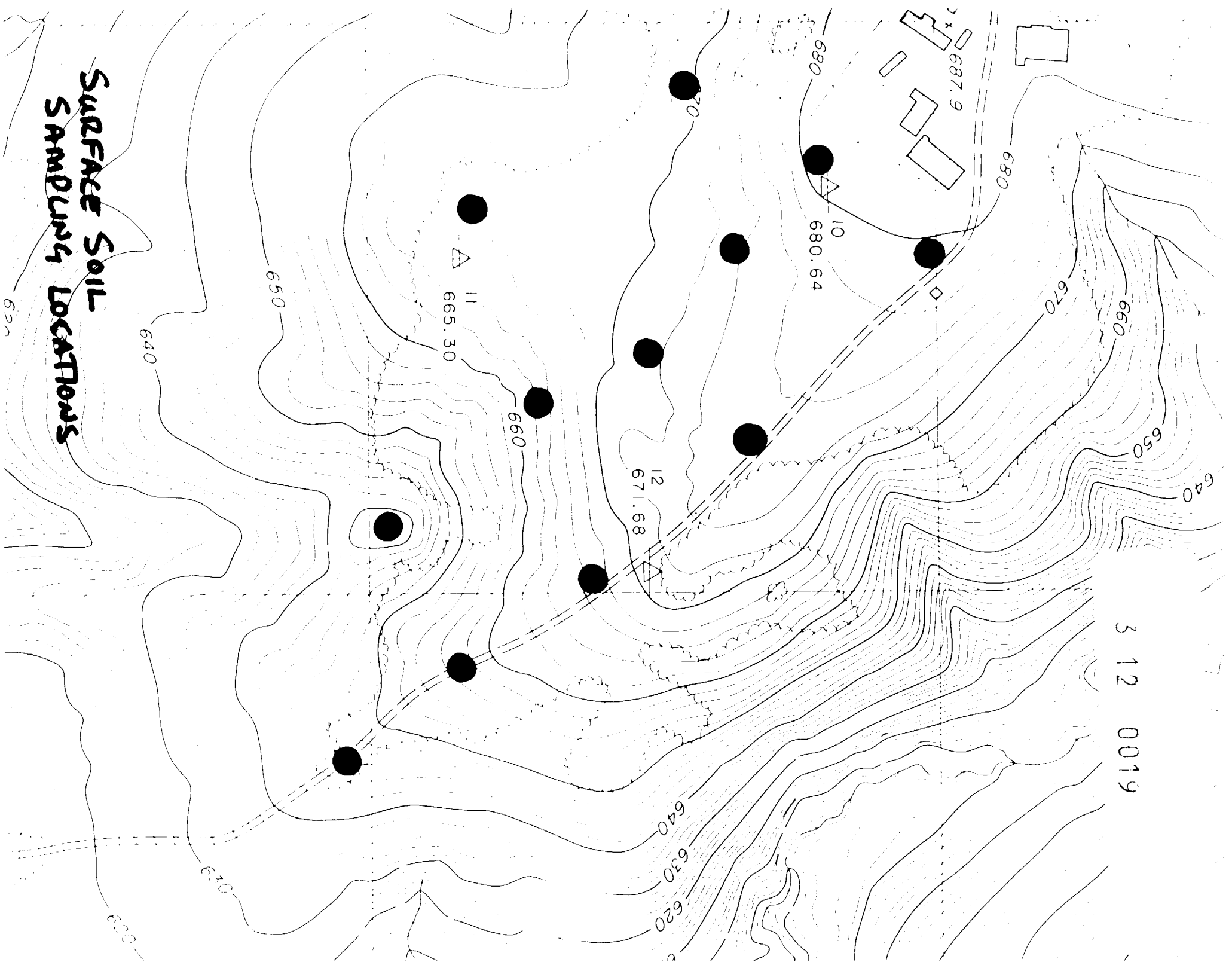
4.2 SCHEDULE

A schedule for completion of the Phase II activities and preparation of the Baseline Risk Assessment and Feasibility Study is presented as Figure 4.1. Time zero for the schedule is EPA approval of the work plan. Implementation of the major work tasks has been divided into discrete, definable tasks to indicate the coordination of parallel and consecutive elements through the project. The schedules for major tasks presume that the work to be accomplished is that identified in the work plan without changes or modifications. The schedule is aggressive for the proposed work scope and is based upon a timely and adequate response by responsible contractors. Contractor mobilization depends on the availability of suitable contractors and equipment lead time and is therefore only an estimate. Implementation of field activities is a function of site conditions, contractor performance, and weather and is only an estimate. Significant changes to the given schedule will be transmitted to EPA at the earliest opportunity.

Work on the Baseline Risk Assessment and Feasibility Study is proceeding at this time and will progress throughout the Phase II investigation. Both projects will be refined as additional data are received, although the documents cannot be completed until all data are reviewed and validated. Preliminary characterization of the Site performed in Phase I of the RI allows Phase II to focus on supporting the evaluation of remedial alternatives. The

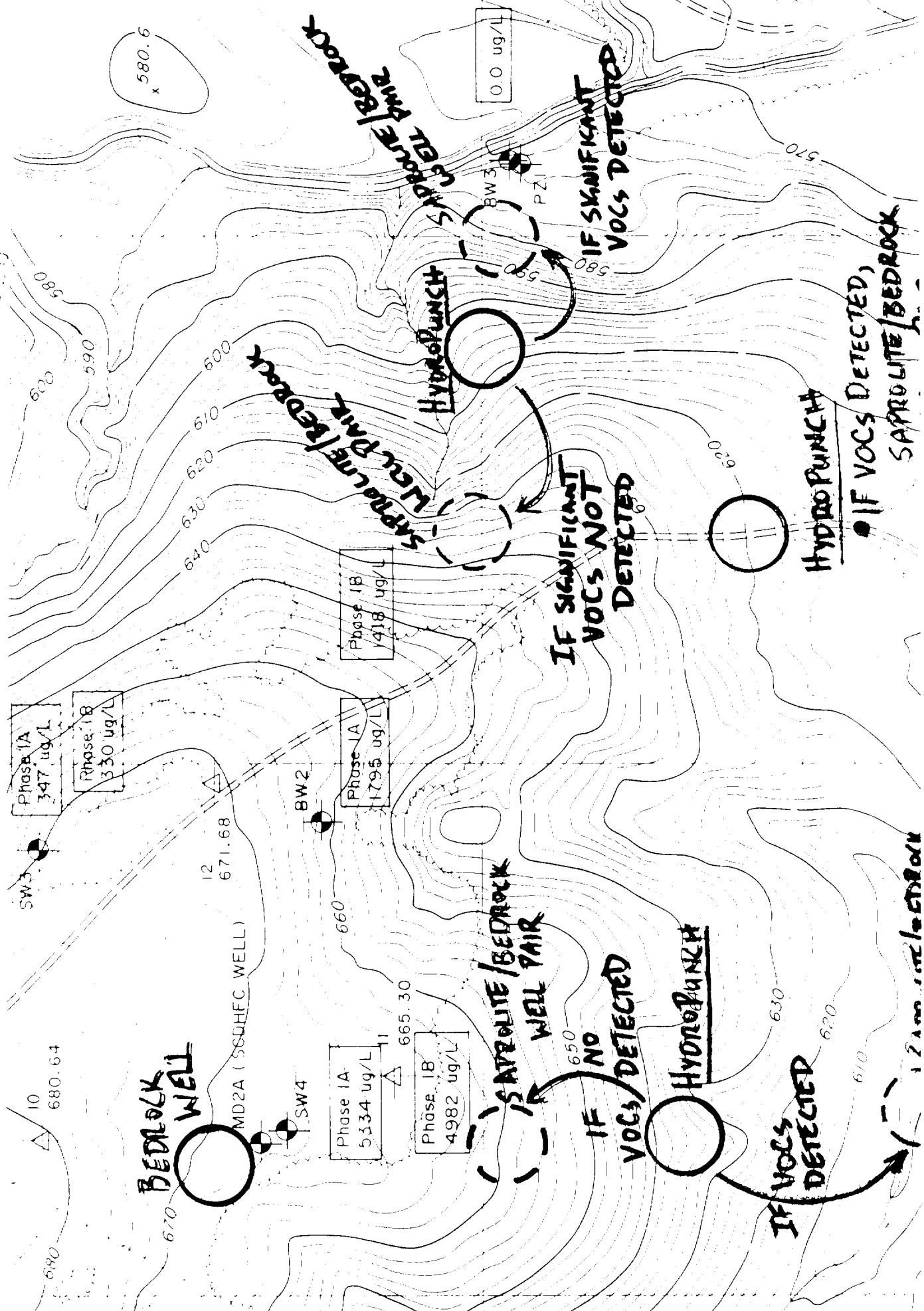
Phase II data should be sufficient to allow preparation of a Remedial Design document, minimizing the need for post-ROD field efforts. Without the Phase II activity, a separate field effort would be required to establish design parameters necessary for any Remedial Action. The overall schedule for implementation of any Remedial Action should therefore be unaffected by the proposed Phase II activities.

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**SURFACE SOIL
SAMPLING LOCATIONS**

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WELL PAIR

WELL PAIR

619.3

- IF VOCs NOT DETECTED,
NO WELLS
- IF NO SAPROLITE AQUIFER,
INSTALL BEDROCK WELL

613
616.66

IF VOCs
DETECTED

SAPROLITE/BEDROCK
WELL PAIR

BW4

0.0 ug/l

635.0

653.8

